receiving a far-end signal in the compander, the far-end signal to be adaptively amplified to compensate for noise;

setting a noise sensitivity coefficient to a variable amount to account for the near-end noise level estimate having an imprecise representation of the near-end noise;

generating a noise adaptive gain in a noise adaptive gain controller, the noise adaptive gain a function of the near-end noise level estimate and the noise sensitivity coefficient;

~~adjusting a~~amplifying the far-end signal ~~compression range of the compander~~ based on the near-end noise level estimate and the noise sensitivity coefficient.~~; and~~

~~amplifying a far-end signal in the far-end signal compression range.~~

12. (previously presented): The method as in claim 11 further comprising:

receiving a far-end noise level estimate of the far-end signal;

adjusting a far-end signal expansion range of the compander based on the far-end noise level estimate; and

varying the amplification of low level far-end noise in the far-end signal expansion range based on the far-end noise level estimate.

13. (previously presented): The method as in claim 11 further comprising varying the far-end signal compression range based on a total gain derived from the near-end noise level estimate and a far-end speech level of the far-end signal.

14. (previously presented): The method as in claim 11 further comprising:

setting a first noise threshold value; and

varying a far-end signal gain based on the near-end noise level estimate and the first noise level threshold value.

15. (previously presented): The method as in claim 11 further comprising:

setting a first noise threshold value; and

varying a far-end signal gain based on the near-end noise level estimate and the first noise level threshold value, wherein the far-end signal gain is between a minimum gain and a maximum gain.

16. (currently amended): The method as in claim 11 further comprising:

receiving a far-end noise level estimate of a far-end signal in ~~the~~ a second compander;

receiving the near-end signal in the second compander, the near-end signal to be noise adaptively amplified to compensate for noise;

adjusting a near-end signal compression range of the second compander based on the far-end noise level estimate; and

amplifying ~~a~~ the near end signal in the near-end signal compression range.

17. (previously presented): The method as in claim 16 further comprising:

adjusting a near-end signal expansion range of the compander based on the near-end noise level estimate; and

varying the amplification of low-level near-end noise in the near-end signal expansion range based on the near-end noise level estimate.

18. (previously presented): The method as in claim 16 further comprising varying the near-end signal compression range based on a total gain derived from the far-end noise level estimate and near-end speech level of the near-end signal.

19. (previously presented): The method as in claim 16 further comprising:

setting a second noise threshold value; and

varying a near-end signal gain based on the far-end noise level estimate and the second noise level threshold value.

20. (previously presented): The method as in claim 16 further comprising:

setting a second noise threshold value; and

varying a near-end signal gain based on the far-end noise level estimate and the second noise level threshold, wherein the near-end signal gain is between a minimum gain and a maximum gain.

21. (currently amended): A system for noise compensation comprising:

a near-end noise level estimator receiving a near-end signal and generating a near-end noise level estimate based on the near-end signal; and

a first noise adaptive compander comprising:

a first input for receiving a far-end signal;

a second input for receiving the near-end noise level estimate;

a first output for producing a near-end noise compensated output signal; and

a noise adaptive gain controller for generating a noise adaptive gain G_N that is a function of the near-end noise level estimate and a noise sensitivity coefficient, the noise sensitivity coefficient is set to a variable value to account for variability in the near-end noise level estimate resulting from imprecise measurement of the near-end noise, ~~a compressor gain control unit, wherein~~ whereby the first noise adaptive compander ~~receives~~ receiving the far-end signal at the first input and ~~receives~~ receiving the near-end noise level estimate at the second input, ~~the compressor gain control unit adaptively adjusts a far-end signal compression range based on the near-end noise level estimate to adaptively compress the far-end signal to compensate for noise, whereby~~ the first noise-adaptive compander ~~operates~~ operating to adjustably amplify the far-end signal based upon the noise adaptive gain G_N ~~near-end noise level estimate~~ to produce the near-end noise compensated output signal at the first output.

22. (currently amended): A system for noise compensation comprising:

a near-end noise level estimator receiving a near-end signal and generating a near-end noise level estimate based on the near-end signal; and

a first noise adaptive compander comprising:

a first input for receiving a far-end signal;

a second input for receiving the near-end noise level estimate;

a first output for producing ~~a~~an ~~near-end noise compensated~~ output signal; and

a noise adaptive gain controller for generating a noise adaptive gain G_N that is a function of the near-end noise level estimate and a noise sensitivity coefficient, the noise

sensitivity coefficient is set to a variable value to account for variability in the near-end noise level estimate resulting from imprecise measurement of the near-end noise, ~~a compressor gain control unit, wherein~~ the first noise adaptive compander ~~receives~~ receiving the far-end signal at the first input and ~~receives~~ receiving the near-end noise level estimate at the second input, ~~the compressor gain control unit adaptively adjusts the gain applied to a far-end signal in a compression range based on the near-end noise level estimate to adaptively compress the far-end signal to compensate for noise, whereby~~ the first noise-adaptive compander ~~operates~~ operating to ~~adjustably amplify~~apply the noise adaptive gain G_N to the far-end signal ~~based upon the near-end noise level estimate to produce~~to compensate the output signal at the first output for near end noise. ~~the near-end noise compensated output signal at the first output.~~

23. (new): The system of claim 21 wherein the near-end signal comprises an information signal and a noise signal, the noise signal inaccurately representing the near-end noise.

24. (new): The system of claim 21 wherein the noise adaptive gain function has a lower bound, a maximum upper bound, and a gain between the lower bound and the upper bound that is a function of the near-end noise level estimate and the noise sensitivity coefficient.

25. (new): The system of claim 21 further comprises:

an adjustable switch allowing a listener to manually adjust the noise adaptive gain controller to select a noise-to-gain relationship as a matter of personal preference.

26. (new): The system of claim 21 further comprises:

a master gain unit for applying a master gain G_M to the far-end signal, the master gain adjusted by the noise adaptive gain G_N.

27. (new): The system of claim 26 wherein the master gain G_M is adapted to adjust the far-end signal based on the noise adaptive gain G_N and a compressor gain G_C, the compressor gain G_C based on the noise adaptive gain G_N.

28. (new): The system of claim 26 wherein the master gain G_M is adapted to adjust the far-end signal based on the noise adaptive gain G_N, a level-normalizing gain G_A, a maximum gain G_{MAX}, a compressor gain G_C, an expander gain G_E, and a limiter gain G_L according to the function $G_M = \min\{G_N * G_A, G_{MAX}, G_C, G_E, G_L\}$.

29. (new): The system of claim 21 further comprises:

a compressor gain control unit for generating a compression gain that is a function of the noise adaptive gain.

30. (new): The system of claim 29 further comprises:

a limiter for generating a limiter gain that has a range of operation affected by the compression gain at an onset point of the compression gain and the strength of the compression gain generated by the compressor gain control unit.

Remarks

This preliminary amendment is made in the RCE with which it is filed. That RCE requests entry of the previously filed Amendment After Final. The preliminary amendment further responds to the final Official Action dated March 21, 2005 and the Advisory Action dated June 8, 2005. A petition for a one month extension of time to respond and authorization to charge Deposit Account No. 50-1058 the large entity extension fee of $120 accompany this amendment. A telephone interview with the Examiner was held on May 12, 2005 and a phone message from the Examiner was left on Dr. Pechanek's phone on May 13, 2005. Claims 2-21 were rejected under 35 U.S.C. § 102 as being anticipated by Matt et al. U.S. Patent No. 5,909,489 (Matt). This ground of rejection is addressed below as is Sjöberg et al. U.S. Patent No. 5,907,823 (Sjöberg) which the Examiner noted in the phone message.

Claims 4, 5, 7, 9-11, 16, 21, and 22 have been amended to be more clear and distinct. New claims 23-30 have been added. Claims 2-30 are presently pending.

Interview Summary

The Examiner is thanked for the courtesy of a telephone interview with Peter Priest and Dr. Pechanek on May 12, 2005 concerning the above case. The art was discussed but no agreement was reached.

The Examiner is further thanked for the telephone message left on Dr. Pechanek's phone on May 13, 2005 concerning the above case. In the May 13, 2005 phone message, the Examiner indicated that he had found new art, Sjöberg et al. U.S. Patent No. 5,907,823 (Sjöberg).

The Art Rejections

The Examiner rejected Claims 2-21 under 35 U.S.C. 102 as being anticipated by Matt. It is clear the rejection based upon Matt is not supported by a careful reading of that reference and the rejections based thereupon should be reconsidered and withdrawn. Further, the Applicant does not acquiesce in the analysis of Matt made by the Examiner in the final Office Action and respectfully traverses the Examiner's analysis underlying its rejections.

Matt discloses a line echo suppressor circuit for a speech communication system. The near-end of Matt's communication system used by a local subscriber A includes a microphone 1.2 which, through an analog to digital converter 1.4, generates transmit path 1.3 signal x(k). The near-end of Matt's communication system further includes a speaker 1.1 which is driven by a receive path 1.5 signal y(k) through an analog to digital converter 1.6. Matt, col. 4, lines 43-53, col. 5, lines 13-16, and Fig. 2a (emphasis added). Matt states one of the steps of "improving transmission properties of an echo affected signal on a transmission link" is "providing, in response to said sensing of the receive path, a noise signal having a magnitude indicative of a noise level on said receive path ...". Matt, col. 2, lines 65-67 and col. 3, lines 5-7 (emphasis added). The "noise level on said receive path" is a noise level "ynlam" "which is a measure of the noise level in receive path 1.5" y(k) which is received from the far end of the system. Matt, col. 6, lines 25-28.

It appears that the closest Matt comes to having a near-end noise level estimator is with the signal "xlam" provided by circuit 3.4. In the Advisory Action of June 8, 2005, the Examiner provided the following analysis, the "Examiner reads the long-term average as a 'near-end' noise

estimate (Col 5 line 55 to Col 6 line 24)." It is inferred from the referenced sections of Matt, that the Examiner believes that the signal "xlam" is a measure of the near-end noise. Also, in the same analysis, the "Examiner reads the near end echo as 'near end noise'." As a matter of clarification, near-end noise is derived from a signal received from a source where the near-end noise is present, such as from a microphone. For example, Matt's microphone 1.2, Figs. 1 and 2a. A near echo 4.1, according to Matt is, for example, created in the first hybrid circuit 4 which is connected to the line echo suppressor 3 and "is characterized by a short, essentially constant delay time". Matt, Figs. 1 and 2a, col. 4, lines 64-67. Matt differentiates between echoes, both near echoes and far echoes, and the receive path noise level and does not treat an echo as near-end noise. Matt, col. 4, line 60 to col. 5, line 5. It is incorrect to consider 'near-end noise' and 'the near end echo' as being the same.

In the Advisory Action, the Examiner described his interpretation of a 'compression range' and the adaptive adjustment of such a range in the Matt patent. The applicant respectfully disagrees with the Examiner's interpretation of the "compression range" and the adaptive adjustment of such range. Thus, while the claims of the present invention have been amended to address additional novel aspects, the applicant does not acquiesce in the analysis of Matt by the Examiner.

Matt does not discuss any problems associated with having an inaccurate indication of the near-end noise. Rather, Matt describes the ambient noise as being "generally uniform" and is silent with regards to the precision of any noise estimate representing the ambient noise. Matt, col. 6, lines 17-20.